USER MANUAL

MODEL 2041

X.21 to HSSI
Interface Converter

PATTON Electronics Co.

An ISO-9001 Certified Company

Part# 07M2041-A
Doc# 077241UA
Revised 3/13/98

SALES OFFICE
(301) 975-1000
TECHNICAL SUPPORT
(301) 975-1007
http://www.patton.com

1.0 WARRANTY INFORMATION

Patton Electronics warrants all Model 2041 components to be free from defects, and will—at our option—repair or replace the product should it fail within one year from the first date of shipment.

This warranty is limited to defects in workmanship or materials, and does not cover customer damage, abuse or unauthorized modification. If this product fails or does not perform as warranted, your sole recourse shall be repair or replacement as described above. Under no condition shall **Patton Electronics** be liable for any damages incurred by the use of this product. These damages include, but are not limited to, the following: lost profits, lost savings and incidental or consequential damages arising from the use of or inability to use this product. **Patton Electronics** specifically disclaims all other warranties, expressed or implied, and the installation or use of this product shall be deemed an acceptance of these terms by the user.

1.1 RADIO AND TV INTERFERENCE

The Model 2041 generates and uses radio frequency energy, and if not installed and used properly—that is, in strict accordance with the manufacturer's instructions—may cause interference to radio and television reception. The Model 2041 has been tested and found to comply with the limits for a Class A computing device in accordance with the specifications in Subpart J of Part 15 of FCC rules, which are designed to provide reasonable protection from such interference in a commercial installation. However, there is no guarantee that interference will not occur in a particular installation. If the Model 2041 does cause interference to radio or television reception, which can be determined by disconnecting the Model 2041, the user is encouraged to try to correct the interference by one or more of the following measures: moving the computing equipment away from the receiver, re-orienting the receiving antenna and/or plugging the receiving equipment into a different AC outlet (such that the computing equipment and receiver are on different branches).

1.2 CE NOTICE

The CE symbol on your Patton Electronics equipment indicates that it is in compliance with the Electromagnetic Compatibility (EMC) directive and the Low Voltage Directive (LVD) of the Union European (EU). A Certificate of Compliance is available by contacting Technical Support.

1.3 SERVICE

All warranty and nonwarranty repairs must be returned freight prepaid and insured to Patton Electronics. All returns must have a Return Materials Authorization number on the outside of the shipping container. This number may be obtained from Patton Electronics Technical Service at **(301) 975-1007**, **http://www.patton.com**, or at **support@patton.com**.

NOTE: Packages received without an RMA number will not be accepted.

Patton Electronics' technical staff is also available to answer any questions that might arise concerning the installation or use of your Model 2041. Technical Service hours: **8AM to 5PM EST, Monday through Friday.**

2.0 GENERAL INFORMATION

Thank you for your purchase of this Patton Electronics product. It has been thoroughly inspected and tested and is warranted for One Year for parts and labor. If you have any questions about this product, please call Patton Electronics Technical Support at (301) 975-1007.

2.1 FEATURES

- Bi-directionally converts between X.21 and HSSI.
- Supports synchronous data rates up to 10Mbps.
- Transparent to synchronous protocol.
- DB-15 and HD-50 connectors with integral 6-foot (1.8m) cable.
- Two versions available:
  Model 2041FT-MC: Connects X.21 (DCE) to HSSI (DTE)
  Model 2041FC-MT: Connects X.21 (DTE) to HSSI (DCE)
- Internal synchronization circuit enables high speed connections
- Externally AC powered.
- Made in the U.S.A.

2.2 DESCRIPTION

The Model 2041 is a X.21 to High Speed Serial Interface (HSSI) converter that lets a device with an X.21 interface communicate bi-directionally with a device that has an HSSI interface. Operating up to a top synchronous data rate of 10Mbps, the 2041 is a perfect problem solver for mismatched interfaces.

The Model 2041 is available in two versions: The Model 2041FT-MC lets a X.21 DCE device communicate with a HSSI DTE device. The Model 2041FC-MT lets a X.21 DTE device communicate with a HSSI DCE device.

All versions are equipped with a female DB-15 connector on the converter end, and a male HD-50 on the end of a 6-foot (1.8 m) cable. Other connector genders and cable lengths are available on a custom basis. Power is supplied to the Model 2041 by an external desktop AC transformer.

3.0 CONFIGURATION

The Model 2041 is easy to install and is ruggedly designed for excellent reliability. The following instructions will help you set up and install the Model 2041 properly.

To use the Patton Model 2041, you must first configure the unit for your application. To do so, first open the case by inserting a flat head screw driver into an open slot on either side of the case, as in Figure 1.

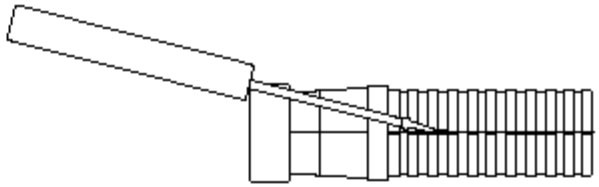

Figure 1: Using a Small Screw Driver to Open the Model 2041 Case

Twist the screw driver head slightly and the top half of the case will separate from the lower half, as in Figure 2. You now have access to the internal switches used to configure the unit.

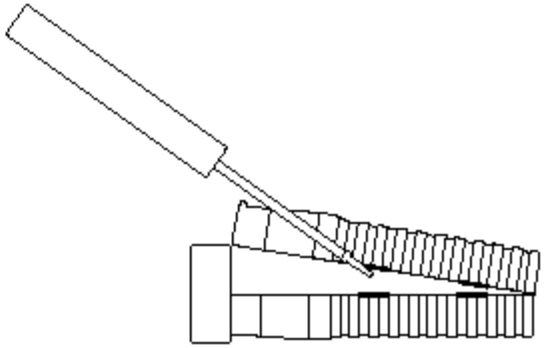

Figure 2: Using a Small Screw Driver to Open the Model 2041 Case

After opening the case, please refer to the section that pertains to your unit for configuration details:

Patton Model Number	**Section**
Model 2041FT-MC	3.1
Model 2041FC-MT	3.2

To close the case, fit the 2 halves together snugly and snap them back in place.

3.1 CONFIGURATION SWITCHES (MODELS 2041FT-MC)

The Model 2041FT-MC has miniature DIP switches that you may use to configure the units. Each Model 2041FT-MC is factory configured as DTE on the X.21 end, and DCE on the HSSI end. Therefore, the X.21 end "wants" to plug directly into a DCE device. Conversely, the HSSI end of the converter "wants" to plug directly into DTE.

Please use this section to configure the internal DIP switches so that the unit will work properly in your application. Figure 3 shows the position of Switch S1 on the top side of the PC board.

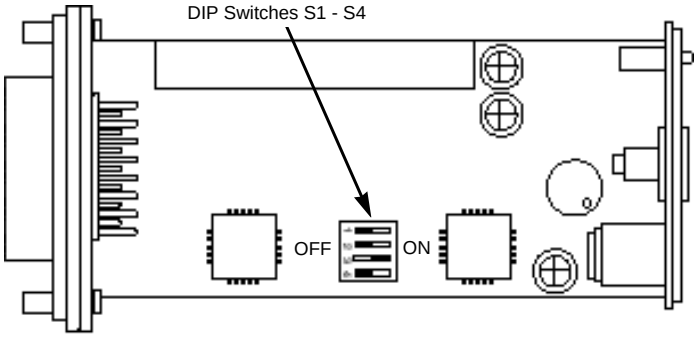

Figure 3. The Model 2041FT-MC Assembly Drawing

Figure 4 shows the orientation of the switches on DIP Switch S1 through S4 with respect to ON/OFF positions. The default settings for DIP Switch S1 are shown in the table on page 6. Detailed descriptions of each switch follow the table.

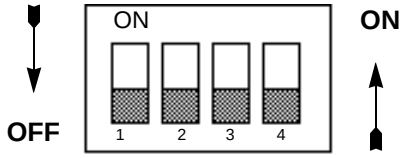

Figure 4. Close-up of DIP Switches Showing "ON" and "OFF" Positions

2041FT-MC DIP SWITCH SUMMARY TABLE			
Position	**Function**	**Factory Default**	
S1	Sync Method	Off	Bypass Sync Circuit
S2	Sync Method	On	
S3	LED Operation	On	LED control by I and TA
S4	LED Operation	On	

Switches S1 and S2: Synchronization Method

Set Switches S1 and S2 together to allow the Model 2041FT-MC to compensate for timing delays when transmitting HSSI data at high speeds (greater than 2.5 Mbps). At high bit rates, set Switch S1 On and Switch S2 Off. In this setting, HSSI data will be synchronized to the Signal Element timing signal from the X.21 side before being converted to X.21 data. At lower bit rates (less than 2.5 Mbps), set Switch S1 Off and S2 On. In this setting, the X.21 data bypasses the synchronization circuit and passes straight through to the HSSI DTE.

S1	S2	Description
Off	Off	Not a Valid Setting
Off	On	Data Skips Sync Circuit
On	Off	Data passes through sync circuit.
On	On	Not a Valid Setting

Switches S3 and S4: Status LED Operation

Set Switches S3 and S4 together to determine the how the Status LED on he 2041FT-MC triggers.

S3	S4	Description
Off	Off	Status LED turned On
Off	On	Status LED controlled by X.21Indication (I) signal
On	Off	Status LED controlled by HSSI Data Terminal Ready (DTR) signal
On	On	Status LED controlled by both "I" and "DTR" signals

3.2 CONFIGURATION SWITCHES (MODELS 2041FC-MT)

The Model 2041FC-MT has miniature DIP switches that you may use to configure the units. Each Model 2041FC-MT is factory configured as DCE on the X.21 end, and DTE on the HSSI end. Therefore, the X.21 end "wants" to plug directly into a DTE device. Conversely, the HSSI end of the converter "wants" to plug directly into DCE.

Please use this section to configure the internal DIP switches so that the unit will work properly in your application. Figure 5 shows the position of Switch S1 on the top side of the PC board.

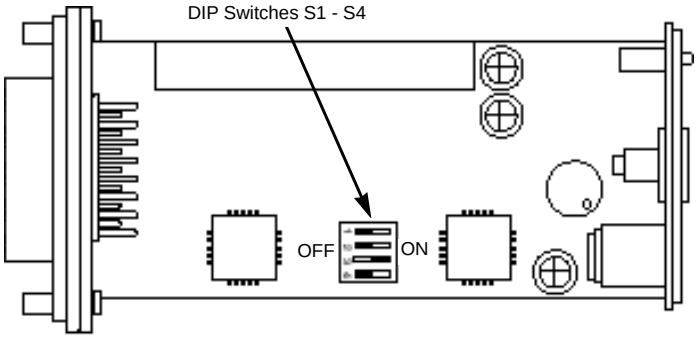

Figure 5. The Model 2041FC-MT Assembly Drawing

Figure 6 shows the orientation of the Switches on DIP Switch S1 with respect to ON/OFF positions. The default settings for DIP switch S1 are shown in the Table 2 on page 8. Detailed descriptions of each switch follow the table.

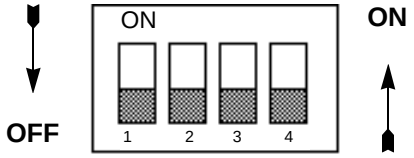

Figure 6. Close-up of DIP Switches Showing "ON" and "OFF" Positions

2041FC-MT DIP SWITCH SUMMARY TABLE			
Position	**Function**	**Factory Default**	
S1	LED Operation	On	LED controlled by"C" or "DTR"
S2	LED Operation	On	
S3	Sync Method	Off	Bypass Sync Circuit
S4	Sync Method	On	

Switches S1 and S2: Status LED Operation

Set Switches S1 and S2 together to determine the how the Status LED on the 2041FC-MT triggers.

S1	S2	Description
Off	Off	Status LED turned On
Off	On	Status LED controlled by X.21Control (C) signal
On	Off	Status LED controlled by HSSI Data Set Ready (DSR) signal
On	On	Status LED controlled by both "C" and "DSR" signals

Switches S3 and S4: Synchronization Method

Set Switches S3 and S4 together to allow the Model 2041FC-MT to compensate for timing delays when transmitting X.21 data at high speeds (greater than 2.5 Mbps). At high bit rates, set Switch S3 On and Switch S4 Off. In this setting, the X.21 data will be synchronized to the RD timing signal before conversion to HSSI. At lower bit rates (less than 2.5 Mbps), set Switch S3 Off and S4 On. In this setting, the X.21 data bypasses the synchronization circuit and is passes straight through to the HSSI DCE.

S3	S4	Description
Off	Off	Not a Valid Setting
Off	On	Data Skips Sync Circuit
On	Off	Data passes through sync circuit.
On	On	Not a Valid Setting

4.0 INSTALLATION

The Model 2041 is designed to connect X.21 devices to devices which employ the HSSI interface standard. This section describes how to install the units.

4.2 2041FT-MC CONNECTION

The Model 2041FT-MC is designed to connect a X.21 DCE device to an HSSI DTE device. In this application, the DB-15 (X.21) and HD-50 (HSSI) male connector of the Model 2041FT-MC may connect directly to their respective equipment ports, or they may connect via a short “straight-through” cable (See Appendix C for Interface Pin Assignments). Figure 7 below illustrates the proper connection of the Model 2041FT-MC.

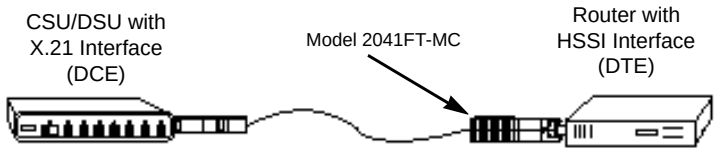

Figure 7. An X.21 DCE to HSSI DTE Installation

4.1 2041FC-MT CONNECTION

The Model 2041FC-MT is designed to connect an X.21 DTE device to an HSSI DCE device. In this application, the DB-15 (X.21) and HD-50 (HSSI) connectors of the Model 2041FC-MT may connect directly to their respective equipment ports, or they may connect via a short “straight-through” cable (See Appendix C for Interface Pin Assignments). Figure 8 below illustrates the proper connection of the Model 2041FC-MT.

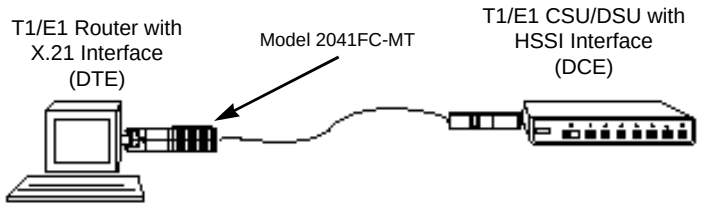

Figure 8. An X.21 DTE to HSSI DCE Installation

4.3 AC POWER CONNECTION

The Model 2041 uses a 5VDC, 2A universal input, power supply that is equipped with a male IEC-320 power entry connector and supports a voltage range of 100-250VAC. This transformer connects to the Model 2041 by means of a cannon jack on the rear panel. There are a variety of domestic and international power cords available for the power entry (See Appendix B). The Model 2041 is powered-up as soon as it is plugged into an AC outlet–there is no power switch.

4.4 DC POWER CONNECTION

You may bypass the DC wall adapter and supply DC power directly to the Model 2041 power supply jack. DC power supplied must be 5VDC ±5%, 1A minimum, center positive, and can be supplied via a barrel type plug with 2.1/5.5/10mm I.D./O.D./Shaft Length dimensions.

NOTE: DC power source must be SELV (Circuit, Safety Extra Low Voltage) specified. (See CENELEC EN60950, Section 1.2.8.5)

Once you have configured the Model 2041 properly (see Section 3.0) and have correctly connected DTE, DCE and power (see Section 4.0), you are ready to operate the unit. This section describes the LED status monitors and loopback test modes.

5.1 BACK PANEL LED STATUS MONITORS

The Model 2041 features two LEDs that are located on the back panel. Figure 9 below shows the positions of the LEDs. Following Figure 9 is a description of each LED.

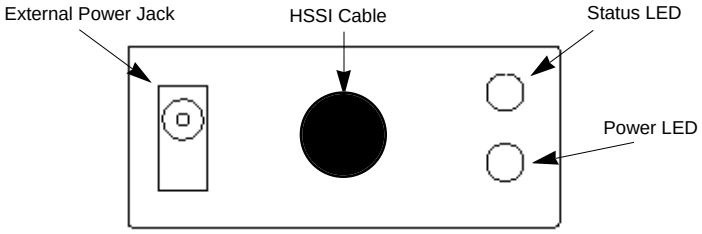

Figure 9. Model 2041 Rear Panel

Status Glows green to indicate that the selected control signals are active:

Model 2041FT-MC: The Status LED can be contstantly On, or it can be controlled by the X.21 "I" and/or HSSI "DTR" signals (see **Section 3.1** to select the desired configuration signal. *Default configuration = LED controlled by both "I" and "DTR")*.

Model 2041FC-MT: The Status LED can be contstantly On, or it can be controlled by the X.21 "C" or HSSI "DSR" signals (see **Section 3.2** to select the desired configuration. *Default configuration = LED controlled by both "C" and "DSR")*.

Power Glows green to indicate that the unit is receiving power.

PATTON MODEL 2041 SPECIFICATIONS

Data Format:	Synchronous
Data Rate:	0 - 10Mbps
Clocking:	All HSSI co-directional timing patterns are supported.
Standards:	Converts ITU/CCITT X.21 to HSSI (ANSI/TIA/EIA-613 Dec. "93 and ANSI/TIA/EIA-612 NOV. "93) electrically and mechanically.
Loopbacks:	Local and Remote
Interfaces:	**Model 2041FT-MC:** Connects X.21 (DCE) to HSSI (DTE) **Model 2041FC-MT:** Connects X.21 (DTE) to HSSI (DCE)
Cable:	6 feet (1.8 m)
Connectors:	Male HD/Slimline 50-pin (HSSI); Female DB-15 (X.21)
Compliance:	FCC Class A, IEC CE (emissions).
Power:	Unit will require an external desk top power supply.
Temperature Range:	0 to 50º C (32 - 122ºF)
Humidity:	5 to 95%, non-condensing
Size:	3.0"L x 1.8"W x 0.8"H (7.6 X 4.4 X 1.9 CM)
Approval:	CE (EMC Directive/EN 50082-1)

APPENDIX B

PATTON MODEL 2041
FACTORY REPLACEMENT PARTS AND ACCESSORIES

Patton Model #	Description
08055DCUI	100-240VAC (+5V ±5% reg. DC/2A) Universal Input Adapter
0805EUR	European Power Cord CEE 7
0805UK	United Kingdom Power Cord
0805US	American Power Cord
0805AUS	Australia/New Zealand Power Cord
0805DEN	Denmark Power Cord
0805FR	France/Belgium Power Cord
0805IN	India Power Cord
0805IS	Israel Power Cord
0805JAP	Japan Power Cord
0805SW	Switzerland Power Cord
07M2041-B	User Manual

APPENDIX C

PATTON MODEL 2041 HSSI INTERFACE
HD-50 CONNECTOR (DCE OR DTE)

Pin #	Signal
1	SGND (Signal Ground)
26	SGND (Signal Ground)
2	RT (Receive Timing-A)
27	RT/ (Receive Timing-B)
3	DSR/(DCE Ready-A)
28	DSR (DCE Ready-B)
4	RD (Receive Data-A)
29	RD/ (Receive Data-B)
5	*Reserved for Future Use*
30	*Reserved for Future Use*
6	ST (Send Timing - A, DCE Source)
31	ST/ (Send Timing-B, DCE Source)
7	*Reserved for Future Use*
32	*Reserved for Future Use*
8	DTR (DTE Ready-A)
33	DTR/ (DTE Ready-B)
9	TT (Terminal Timing-A, DTE Source)
34	TT/ (Terminal Timing-B, DTE Source)
10	LA (Loopback A-A)
35	LA/ (Loopback A-B)
11	SD (Send Data A)
36	SD/ (Send Data B)
12	LB (Loopback B-A)
37	LB/ (Loopback B-B)
13	*Reserved for Future Use*
38	*Reserved for Future Use*
14 - 18	*Reserved for Future Use*
39 - 43	*Reserved for Future Use*
19	*Reserved for Future Use*
44	*Reserved for Future Use*
20 - 23	*Reserved for Future Use*
45 - 48	*Reserved for Future Use*
24	TM - Test Mode (Indication-A)
49	TM/ - Test Mode (Indication-B)
25	SGND (Signal Ground)
50	SGND (Signal Ground)

APPENDIX C

PATTON MODEL 2041 X.21 INTERFACE
DB-15 CONNECTOR (X.21 DCE OR DTE)

Pin #	Signal
1	FG (Frame Ground)
2	T (Transmit - A)
3	C (Control - A)
4	R (Receive - A)
5	I (Indication - A)
6	ST (Signal Timing - A)
7	not connected
8	SG (Signal Ground)
9	T/ (Transmit - B)
10	C/ (Control - B)
11	R/ (Receive - B)
12	I/ (Indication - B)
13	ST/ (Transmit Data-B)
14	not connected
15	not connected

Dear Valued Customer,

Thank you for purchasing Patton Electronics products! We do appreciate your business. I trust that you find this user manual helpful.

We manufacture one of the widest selections of data communications products in the world including CSU/DSU's, network termination units, powered and self-powered short range modems, fiber optic modems, interface converters, baluns, electronic data switches, data-line surge protectors, multiplexers, transceivers, hubs, print servers and much more. We produce these products at our Gaithersburg, MD, USA, facility, and can custom manufacture products for your unique needs.

We would like to hear from you. Please contact us in any of the following ways to tell us how you like this product and how we can meet your product needs today and in the future.

Web:	http://www.patton.com
Sales E-mail:	sales@patton.com
Support E-mail:	support@patton.com
Phone - Sales	(301) 975-1000
Phone - Support	(301) 975-1007
Fax:	(301) 869-9293
Mail:	Patton Electronics Company 7622 Rickenbacker Drive Gaithersburg, MD 20879 USA

We are committed to a quality product at a quality price. Patton Electronics is BABT and ISO 9001 certified. We meet and exceed the highest standards in the industry (CE, UL, etc.).

It is our business to serve you. If you are not satisfied with any aspect of this product or the service provided from Patton Electronics or its distributors, please let us know.

Thank you.

Burton A.Patton
Vice President

P.S. Please tell us where you purchased this product.

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